

# Sun Protection Factor (SPF)

SPF is a measure of how much solar energy (UV radiation) is required to produce sunburn on protected skin (i.e., in the presence of sunscreen) relative to the amount of solar energy required to produce sunburn on unprotected skin. As the SPF value increases, sunburn protection increases.

There is a popular misconception that SPF relates to time of solar exposure. For example, many consumers believe that, if they normally get sunburn in one hour, then an SPF 15 sunscreen allows them to stay in the sun 15 hours (i.e., 15 times longer) without getting sunburn. This is not true because SPF is not directly related to *time* of solar exposure but to *amount* of solar exposure. Although solar energy amount is related to solar exposure time, there are other factors that impact the amount of solar energy. For example, the intensity of the solar energy impacts the amount. The following exposures may result in the same amount of solar energy:

- one hour at 9:00 a.m.
- 15 minutes at 1:00 p.m.

Generally, it takes less time to be exposed to the same amount of solar energy at midday compared to early morning or late evening because the sun is more intense at midday relative to the other times. Solar intensity is also related to geographic location, with greater solar intensity occurring at lower latitudes. Because clouds absorb solar energy, solar intensity is generally greater on clear days than cloudy days.

In addition to solar intensity, there are a number of other factor that influence the amount of solar energy that a consumer is exposed to:

- skin type
- amount of sunscreen applied
- reapplication frequency

Fair-skinned consumers are likely to absorb more solar energy than dark-skinned consumers under the same conditions. The amount of sunscreen applied also impacts the amount of solar radiation absorbed, because more sunscreen results in less solar energy absorption. Because sunscreens wear off and become less effective with time, the frequency with which they are reapplied is critical to limiting absorption of solar radiation. The reapplication frequency is also impacted by the activities that consumers are involved in. For example, consumers who swim while wearing sunscreen need to reapply the sunscreen more frequently because water may wash the sunscreen from the body. In addition, high levels of physical activity require more frequent reapplication because the activity may physically rub off the sunscreen and heavy sweating may wash off the sunscreen. In general, more frequent reapplication is associated with decreased absorption of solar radiation.

Because of the various factors that impact the amount of solar radiation, SPF does not reflect time in the sun. In other words, SPF does not inform consumers about the time that can be spent in the sun without getting sunburn. Rather, SPF is a relative measure of the amount of sunburn protection provided by sunscreens. It allows consumers to compare the level of sunburn protection provided by different sunscreens. For example, consumers know that SPF 30 sunscreens provide more sunburn protection than SPF 8 sunscreens.

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